

REMARKS

By the present amendment, claims 1-10, 21-31, 37, 38, and 40 are canceled.
Claims 11-20, 32-36, 39, and 41 are pending.

1. Amendments to the Claims

Claim 32 is amended to incorporate the limitations of claims 38 and 40. Claim 39 is amended to depend from claim 32. No new matter has been introduced.

2. Claim Rejections under 35 U.S.C. § 112

Claims 1, 29-30 and 40-41 are rejected under 35 U.S.C. 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 29-30 and 40 are canceled. Therefore, the rejection of these claims is moot.

With regard to claim 41, Applicant amended claim 32 to include "wherein the ratio of penetration depth of the energy to a velocity boundary layer of the edible fluid is less than about 1". This amendment provides antecedent basis for the "the velocity boundary layer" in claim 41. Accordingly, the rejection is overcome.

3. Claim Rejections under 35 U.S.C. § 102

3.1 U.S. Patent No. 5,439,652 to Sczechowski, et al.

Claims 1-3, 5-9, 11-14 and 16-20 are rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by Sczechowski, et al., U.S. Patent No. 5,439,652. Claims 1-3, 5-9 are canceled; therefore the rejection is moot with respect to these claims. With regard to claims 11-14 and 16-20, Applicant respectfully traverses the rejection.

Claim 11 is independent, and claims 12-14 and 16-20 depend from claim 11. Claim 11 is generally directed to a fluid reactor comprising, among other elements, two annular channels in which fluid is exposed to radiation. See for example Fig. 4 of the present specification. Sczechowski et al. fails to disclose a fluid reactor comprising two annular channels as required by claim 11. Thus, Sczechowski does not anticipate claim 11 for at least the reason that Sczechowski fails to disclose a fluid reactor comprising two annular channels.

Claims 12-14 and 16-20 depend from claim 11 and incorporate the limitations of claim 11. Therefore, claims 12-14 and 16-20 are not anticipated by Sczechowski for at least the reasons claim 11 is not anticipated.

3.2 Sczechowski et al. "A Taylor Vortex Reactor For Heterogeneous Photocatalysis" (Sczechowksi II).

Claims 1-3, 5-9, 11-14 and 16-20 are rejected as anticipated under 35 U.S.C. § 102(b) because Sczechowski II allegedly discloses each element of the claims. Claims 1-3 and 5-9 are canceled, and the rejection is therefore moot with respect to these claims. With regard to claims 11-14 and 16-20, Applicant respectfully traverses the rejection.

As noted above, claim 11 is generally directed to a fluid reactor comprising, among other elements, two annular channels. Sczechowski II fails to disclose a fluid reactor comprising two annular channels. Accordingly, Schzechowksi II cannot anticipate claim 11 or dependent claims 12-14 and 16-20.

3.3 U.S. Patent No. 6,576,201 to Woo et al.

Claims 1-28 and 31 are rejected as allegedly anticipated by U.S. Patent No. 6,576,201 to Woo et al. under 35 U.S.C. § 102(e). Claims 1-10, 21-31 are canceled; therefore the rejection is moot with respect to these claims. With regard to claims 11-20, Applicant respectfully traverses this rejection.

As noted above, claim 11 is generally directed to a fluid reactor comprising, among other elements, two annular channels in which fluid is exposed to radiation. See for example Fig. 4 of the present specification. Woo et al. fails to disclose a fluid reactor comprising two annular channels as required by claim 11. Thus, Woo et al. does not anticipate claim 11 for at least the reason that Woo et al. fails to disclose a fluid reactor comprising two annular channels.

Claims 12-14 and 16-20 depend from claim 11 and incorporate the limitations of claim 11. Therefore, claims 12-14 and 16-20 are not anticipated by Woo et al. for at least the reasons claim 11 is not anticipated.

4. Claim Rejections under 35 U.S.C. § 103

Claims 32-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woo, et al., and further in view of Rolchigo et al., U.S. Patent No. 5,993,674 and Wilson U.S. Patent No. 4,963,750. Applicant respectfully traverses the rejection.

The United States Patent and Trademark Office (USPTO) has the burden of showing a prima facie case of obviousness. *In re Bell*, 991 F.2d 781, 783 (Fed. Cir.

1993). In determining obviousness, the invention must be considered as a whole, and the claims must be considered in their entirety. *Medtronic, Inc. v. Cardiac Pacemakers, Inc.*, 721 F.2d 1563, 1567 (Fed. Cir. 1983). A prima facie case of obviousness is established when the teachings from the prior art itself would have suggested the claimed subject matter to a person of ordinary skill in the art. *In re Rhinehart*, 531 F.2d 1048, 1051 (CCPA 1976). More specifically, the requirements for establishing a prima facie case of obviousness include: (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; (2) there must be a reasonable expectation of success; and (3) the prior art reference (or references when combined) must teach or suggest all the claim limitations.

When a rejection depends on a combination of prior art references, the USPTO must show that there is some teaching, suggestion, or motivation to combine the references. *In re Geiger*, 815 F.2d 686, 688 (Fed. Cir. 1987). The mere fact that the prior art could be modified would not have made the modification obvious unless the prior art suggested the desirability of the modification. *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). Finally, obviousness may not be established using hindsight. *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1551 (Fed. Cir. 1983).

Claim 32 is directed to a method of disinfecting a fluid by forming Taylor vortices in an edible fluid comprising an organism, wherein the edible fluid has a Taylor number of between about 40 to about 400, and irradiating the fluid with an anti-microbial amount of energy, wherein the ratio of penetration depth of the energy to a velocity boundary layer of the edible fluid is less than about 1. Applicant respectfully submits that Woo et al, Rolchigo et al. and Wilson fail to teach or suggest each element of claim 32.

The Office Action describes Woo et al. as teaching the disinfection of fluids in general. Woo et al. teaches the disinfection of biological fluids such as blood, plasma, and fractions of blood (col. 1, lines 18-19). Woo et al. fails to teach or suggest using

Taylor-Couette devices to disinfect edible fluids. Moreover, Woo et al. fails to teach or suggest disinfecting edible fluids having a Taylor number of between about 40 to 400. Woo et al. also fail to teach or suggest irradiating the edible fluid with an anti-microbial amount of energy, wherein the ratio of penetration depth of the energy to a velocity boundary layer of the edible fluid is less than about 1. Because Woo et al. fails to teach or suggest each element of the claim, Woo et al. cannot render claim 32 or its dependent claims obvious.

The Office Action cites Rolchigo et al. as allegedly teaching a Taylor-Couette type rotary fluid treatment device for effective treatment of a variety of fluids including edible fluids and thereby cures any deficiencies in the teachings of Woo et al. Applicant respectfully disagrees.

Rolchigo et al. teach a rotary filtration device for filtering fluids. The only mention of Taylor numbers in Rolchigo et al. occurs in column 2, lines 31-50 in the Background Section of the patent when discussing prior art filters. In particular, Rolchigo et al. teach that "[a]bove a certain value of the Taylor number, a vortical flow profile comprising so-called Taylor vortices appears. This type of secondary flow causes highly efficient non-turbulent shear at the filter surface(s) that reduces the stagnant boundary layer thickness and, thus, increases the permeate flux." Rolchigo et al. fails to teach or suggest using Taylor-Couette devices for disinfecting edible fluids having a Taylor number of between about 40 to 400 by irradiating the edible fluid with an anti-microbial amount of energy, wherein the ratio of penetration depth of the energy to a velocity boundary layer of the edible fluid is less than about 1. Because Rolchigo et al. fails to cure the deficiencies of Woo et al., the combination of Woo et al. with Rolchigo et al. cannot render claim 32 or its dependent claims obvious.

Additionally, one of ordinary skill in the art would not have been motivated to combine the teachings of Rolchigo et al. with the teachings of Woo et al. because Rolchigo et al. is directed to filtration devices; whereas Woo et al. is directed to using Taylor-Couette devices to disinfect blood.

Lastly, Wilson is cited by the Examiner as teaching the conventionality of UV sterilizing treatment of waste water. Applicant has amended the claims to be directed to edible fluids. Accordingly, Wilson fails to teach or suggest using Taylor-Couette

devices for disinfecting edible fluids having a Taylor number of between about 40 to 400 by irradiating the edible fluid with an anti-microbial amount of energy, wherein the ratio of penetration depth of the energy to a velocity boundary layer of the edible fluid is less than about 1.

CONCLUSION

In light of the foregoing amendments and for at least the reasons set forth above, Applicant respectfully submits that all objections and/or rejections have been traversed, rendered moot, and/or accommodated, and that the now pending claims 11-20, 32-36, 39, and 41 are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned agent at (770) 933-9500.

Respectfully submitted,



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